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A STUDY OF THE ETIOLOGY AND DEVELOPMENT OF THE CREATIVE PERSONALITY.

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THE BACKGROUNDS, MOTIVATIONS, AND PERSONALITIES OF THREE GROUPS WERE INVESTIGATED TO DETERMINE THE SOURCE AND TYPE OF EDUCATIONAL, ENVIRONMENTAL, AND SOCIAL CONDITIONS THAT ARE CONDUCIVE TO CREATIVE PRODUCTIVITY. A SAMPLE OF 30 PSYCHOLOGISTS WAS SELECTED AND, AFTER SOME INVESTIGATION, WAS DIVIDED INTO THE FOLLOWING GROUPS--(1) CREATIVE, (2) NONCREATIVE, PRODUCTIVE, AND (3) NONCREATIVE, NONPRODUCTIVE. EACH SUBJECT PARTICIPATED IN AN UNSTRUCTURED PERSONAL INTERVIEW FROM WHICH INDIVIDUAL IDENTIFICATION WAS MADE ON A NUMBER OF PERTINENT FACTORS INCLUDING MOTIVATION, PERSONALITY, ETIOLOGY, DEVELOPMENT, AND EDUCATION. THE COLLECTED DATA WERE ANALYZED, AND CROSS-CORRELATIONS OF ALL FACTORS WERE MADE TO ESTABLISH SOME FORMIDABLE COMPARISONS AMONG THE SUBJECT GROUPS. CONCLUSIONS WERE THAT SOME REVISION OF CURRENT PROFESSIONAL TRAINING PROCEDURES COULD BE OF BENEFIT IN THE ENCOURAGEMENT OF CREATIVITY, AND THAT THE FAMILY AND EMOTIONAL AND EDUCATIONAL ENVIRONMENTS ARE OF CONSIDERABLY GREATER IMPORTANCE IN FOSTERING CREATIVITY THAN THE FAMILY SOCIOECONOMIC CIRCUMSTANCES. EARLY FAMILY RESPONSIBILITY AND OPPORTUNITIES FOR INDEPENDENT ACTION WERE ALSO CONSIDERED TO BE OF VALUE. IN ADDITION, IT APPEARED THAT EDUCATIONAL EXPERIENCES ARE INFLUENTIAL IN FOSTERING OR SUPPRESSING CREATIVE POTENTIAL. (JH)

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A STUDY OF THE ETIOLOGY AND DEVELOPMENT OF THE CREATIVE PERSONALITY

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A PILOT STUDY

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INTRODUCTION

Intellectual genius and creativity have long been considered, if not synonymous, at least very highly correlated. Studies by M.I. Stein, Catherine Cox, J.P. Guilford, Frank Barron, and Anne Roe have suggested that this may be a misapprehension and that creativity, given a certain minimum intellectual level, may be primarily dependent upon personality characteristics. Support of a significant degree for this thesis may be found in the investigations of R.B. Cattell and the present investigator. All of these investigations suggest that many of the most creative persons of both the past and present have been and are of only moderately superior intelligence. This thesis is of particular importance for the production of future creators upon which the survival of this nation, and perhaps even of Western civilization, depends. Little or nothing as yet can be done to increase the intellectual capacity of the population, but if, as presently proposed, creativity is more dependent upon personality characteristics than upon intellectual characteristics, a great deal may be done to increase the creativity of the population for it is virtually axiomatic, among many psychologists at least, that personality characteristics are learned and, personality-wise, the individual is a product of his environment. For this reason, it is of the utmost importance to gain a more thorough knowledge of the environmental (social and familial) background of creative persons as well as information concerning their attitudes, self-concepts, and values. Once these are known, methods may be developed to produce, in persons with the basic minimum intellectual qualifications, a greater degree of creativity than our contemporary educational and social systems produce.

This is of particular and immediate importance to the general field of education. American educational institutions play a highly significant role in

the development of an individual's personality inasmuch as they have a great deal of contact with an individual during most of his formative years. In addition to this direct contact and influence, the educational system is able to influence the adult population (through adult education courses and through public addresses as well as through contact with study groups, etc.). Therefore, if much is to be done in encouraging the development of creativity and an environment favorable for such development, a major portion of the responsibility will fall upon the public educational systems of the nation. In order to carry out this responsibility, educators must have information concerning the environmental conditions and influences that aid in the development of the creative personality.

PURPOSE

The purpose of this study is to provide some possibly pertinent information regarding the environmental circumstances surrounding the creative, as opposed to the non-creative, individual as well as to provide some further information concerning his personal educational and social characteristics and experiences. This has been done through the use of recorded interviews analyzed by clinically trained judges as well as by means of objective tests of personality and motivational factors.

Because this study is intended to be a pilot study, the number of subjects will of necessity be small and the results must be interpreted as suggestive only. Despite this limitation, it is encouraging to note that the results of this study are similar in quite a few respects to results reported from other on-going studies in this general area.

PROCEDURE

Possibly one of the most important, and too often ignored, problems in the study of the creative person is the criterion problem. By the time death and history have had their say, it is obviously too late to study the individual;

and prior to some overt display and consequant evaluation of a person's productivity, there is no adequate means of identification available at this time. Consequently, we must depend upon some sort of contemporaneous evaluation of a person in order to catagorize him as creative or not creative. The judgements of a small group of experts in the field have been used successfully in the past; but is was felt that a broader base of judgement would be more desirable.

Psychologists were chosen as the potential subjects for this study for several reasons. They were a group with whom the principal investigator was thoroughly familiar, they were a group representative of both the social and natural sciences, and because of the nature of their training, a group that might be better able to provide insightful interview information.

In order to select the experimental sample, a group of ten psychologists were asked to submit a list of persons in the field of psychology whom they felt, on the basis of personal familiarity with their work (not just by reputation), had made decidedly creative contributions to knowledge in psychology. Those persons who were independently listed three or more times were then included on a rating list. The final rating list consisted of two hundred and twenty-eight names of eminent American psychologists plus twelve psychologists who were either highly visable or highly productive but who, in the judgement of the selection committee, were decidedly non-creative. This was done in order to provide a "X" Factor or control, so that there would be some evidence that the final ratings were being made on the basis of judgements of creativity rather than judgements of visability or productivity. The final ratings were obtained by asking each of the subjects to rate the others on the list on a three point scale of creativity. The points being:

(1) Has shown little evidence of creativity
(2) Has shown significant evidence of creativity
(3) Has made outstandingly creative contributions

In order to minimize rating by guess, or by reputation, the subjects were asked to rate only those persons on the list with whom they were personally familiar. There was an eighty percent return of the completed rating lists and there were only seventeen subjects who received less than fifty ratings with the average number of ratings being over one hundred. No one in the final creative group was selected on the basis of less than seventy-five ratings. When the ratings were tabulated they formed a decidedly bi-modal distribution (see fig. 1) suggesting that the rating procedure had identified two separate and distinct populations. All of the twelve control group members were in the lower twenty-five percent of the distribution although several had rated somewhat higher than anticipated. The final experimental sample was selected randomly from the upper twenty percent of the distribution.

Letters were then written to the experimental sample asking their further cooperation in undergoing an unstructured, personal interview, and in taking several objective psychological tests. Approximately ninty percent of the prospective subjects replied in the affirmative; but because of scheduling difficulties, a little less than fifty percent (eighteen) were finally contacted. In addition, a small sample (five) of productive psychologists from the center of the distribution was used as a control as well as a group of seven psychologists holding responsible academic or professional positions who had shown no tendency whatever to creative effort. In the opinion of their peers, however, they had the intellectual and educational requirements necessary to creativity. This, then, provided an experimental group of eighteen subjects and a combined control group of twelve subjects - small samples, but sufficient for the purposes of a pilot study.

An interview, which might best be described as a sample of "autobiographical verbal behavior", was collected from each subject. The length of the interviews ranged from one to three hours. In addition, the subjects were

asked to complete two objective psychological tests - Cattell's Sixteen Personality Factor Test and Cattell's Motivational Analysis Test. There were several in each group who did not return the objective tests so the results based upon these came from a slightly smaller number. The tests were scored and interpreted by standard methods, but the interviews required a more extensive analysis. For this purpose, a rating questionnaire was devised (see appendix A) and each of five clinically trained judges was asked to rate each subject on each of eighty-nine interview variables. Reliabilities among judges' ratings were obtained by Pearson correlation coefficients and the significance of the differences between means of the various groups on both the test and interview variables was obtained by means of a t-test.

RESULTS

Comparisons were made between the Creative, Non-creative productive, and Combined Control groups on the Motivational Analysis Test, and between the Creative, Non-creative Non-productive, Non-creative Productive, and the Combined Control groups[1] on the Sixteen Personality Factor Test and the interview variables. Reliabilities on the interview ratings among four out of five judges ranged from .50 to .70. Reliabilities of the fifth judge compared with the other four ranged between .21 and .33. Despite this deviation, the final score on the interview variables was obtained by averaging the ratings of all five judges. In view of the interpretative nature of a number of the required ratings it was felt that the inter-judge reliabilities were satisfactory.

On the interview variables (tables I, II , & III) there was a significant difference between the C, the NCNP, and the CC groups on variable one, with

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1. Hereafter, the experimental groups will be designated as follows:
   C = Creative group
   NCP = Non-creative Productive group
   NCNP = Non-creative Non-productive group
   CC = Combined Control group

the creative group in both instances indicating a decidedly lesser degree of authoritarian relationships with their graduate instructors. On variable two there was a difference between the C and NCP groups with the latter showing a more competative than cooperative relationship with fellow graduate students than the C group. On variable three skepticism and inquisitiveness were significantly encouraged in the C group, but not in the NCNP group. The differences on variable four indicate that the C group had a decidedly less structured graduate training than did the NCNP group. On variable eight, parental figures provided significantly more educational stimulation for the C group than for the NCP group; but there was no significant difference between the C and NCNP groups. On variable eleven, the C group showed a greater degree of independence in college than did the NCNP group; but there was no significant difference between the C and NCP groups in this regard. On factor twelve the C group showed a decidedly greater tendency to independence in research than did the NCNP group, although they did not differ significantly from the NCP group. On factor thirteen, the C group showed significantly greater interest than either of the control groups in the dispassionate investigation of behavior rather than in "helping people". On factor sixteen, although neither the NCP nor the NCNP group was significantly different from the C group in regard to the influence of their professors, when the control groups were combined they showed a significant tendency to be more influenced by senior professors, especially in the direction of their work than did the C group.

On factor twenty the C group was publishing significantly more independent work while in college than the NCNP group, but was not significantly different from the NCP group in this respect. Factor 21 suggests that the pressure of professional and administrative committments has interfered less with the current research efforts of the C group than it has with the NCNP group. The NCP group was not significantly different from the C group on this factor. The differences found on variable twenty-two indicate that

neither the C nor the NCP group had thoroughly outlined and closely supervised training, while the NCNP group appears to have experienced much closer supervision and control during graduate training. On variable twenty-three those in the C group show a more positive attitude toward their own graduate training than either the NCP or NCNP group; although none of them indicate a thoroughly negative attitude. On variable twenty-four the C group shows it had a significantly greater degree of freedom of choice in regard to both formal courses and research areas than did either the NCP or NCNP groups. Here, the results would suggest that the differences are more in terms of degree of freedom rather than in terms of freedom as opposed to rigidity. On variable twenty-seven the C group appears to be very much more industrious and scientifically active than the NCNP group, but does not differ from the NCP group. As seen on variables twenty-nine and forty-three, the C and the NCP groups showed fewer signs of neuroticism in early life and at present than the NCNP group; although none of them could be considered, according to the ratings, the epitome of adjustment. The NCNP group felt considerably greater social inferiority in early life than did either the C or NCP groups (item thirty-one); and as shown in item thirty-two, this feeling has persisted throughout adult life. The results on variables thirty-three, thirty-four, seventy-seven, and seventy-eight would suggest that authority problems are also more common among the NCNP group than among either the C or NCP groups in as much as the attitude toward authority of the NCNP group is largely one of active contempt whereas among the C and NCP groups it is more an attitude of non-concern. They appear to be more inclined to ignore rather than battle authority. This attitude, however, is less prevalent among the NCP group than among those in the C group in as much as a slightly greater tendency toward contempt than non-concern is shown when the NCP group is added to the NCNP group.

Considering variable forty-two, the NCP group shows a somewhat striking tendency to have been given fewer home responsibilities at an early age

than either the C or NCNP groups. Item forty-four indicates that the C group displayed a significantly stronger attachment to and positive feeling toward the mother than the father in early life. Item forty-five indicates that reward had been used considerably more frequently than punishment as a training device in the C group as opposed to the NCNP group. There was not a significant difference between the C and NCP groups in regard to this factor. Item forty-eight indicates that the NCNP group has a much stronger tendency to avoid criticism than either the C or NCP groups, although as seen in item forty-nine, once criticism is forthcoming, all three groups are reasonably accepting in regard to it. As shown in item fifty-two, the C group showed significant evidence of creativity in early life as compared with the NCNP group; but there was no appreciable difference between the C and NCP groups in this respect. In regard to variable fifty-six, the C group shows a significantly greater degree of adherence to the tenets of some orthodox religion than either of the control groups. The ratings, however, suggest that this greater degree of adherence does not indicate any significant degree of religious orthodoxy. In addition, variables fifty-eight and fifty-nine suggest that the C group has less need for approval and finds it more often in "in-group" or "professional groups" than does the NCNP group. The NCP group was not different from the C group in regard to this characteristic. The C group also shows less concern over relationships with the opposite sex or sexual life in general than the NCNP group shows; and again it is not significantly different from the NCP group in this characteristic. Early social adjustment (variable sixty-one) was of considerably less importance to the C group than to the NCNP group or to the NCP group, although the latter is not significantly different from the C group even though it contributes to a higher degree of significance between the C and the CC groups than was found between the C and the NCNP groups. On variable sixty-nine the C group indicates a lesser fear of authority than the NCNP group, but is not significantly

different from the NCP group.

On item seventy-two the NCP group shows significantly less family pressure for educational achievement than does the C group; and the addition of the NCNP group to the CC group slightly increases rather than decreases the degree of significance, suggesting that family pressure for educational achievement may well be of considerable importance. On item seventy-five the NCP group also shows somewhat more liberal social and political attitudes than does the C group; but neither group, according to the ratings, could be considered anything but slightly "left of center" politically and socially. Variable eighty-one suggests that periods of greatest creativity came earlier in the career of the C group than the NCNP group. Again there is no significant difference between the C and NCP groups. The results on variable eighty-three indicate that intrinsic motivation is of considerably greater importance for the C group than for the NCNP group. The NCP group is not significantly different from the C group.

On the Motivational Analysis Test there was only one clear-cut difference between groups. In this instance, the C group showed a significantly greater attachment to home and family than did the NCP group. On the Sixteen Personality Factor Test, however, there were a number of differences among groups, as can be seen in Tables IV, V, and VI. On factor E, the NCP group showed a significantly greater degree of dominance, aggressiveness and competativeness than did the C group. There was no difference between the C and NCNP groups on this factor. The NCP group also showed a greater degree of surgency (factor F) and a lesser degree of conscientiousness and persistence (Factor G, Super-Ego Strength) than did the C group. Again there was no difference between the C and NCNP groups on these factors. On factor H, the C group was significantly more adventurous and responsive than the NCNP group, but significantly less so than the NCP group. In this characteristic, the C group therefore occupies a middle ground between the NCP and the NCNP groups.

On the factor of Bohemian Unconcern (') the C group shows a significantly lesser tendency to unconventionality and more concern with practicality than the NCMP group; but does not differ from the NCP group on this factor. On factor N, the C group shows a greater degree of sophistication and insight than does the NCP group; but again there is no difference between the C and the NCMP groups. On factors O and Q4 the NCMP group displays a greater degree of insecurity, anxiety, and tenseness than do either the C or NCP groups.

DISCUSSION

No attempt has been made to compare the experimental groups in this study to the normal population. In regard to the Sixteen Personality Factor Test and the Motivational Analysis Test, such comparisons have been made before. As far as the interview analysis rating sheet is concerned, it is so constructed as to be largely inappropriate for a sample of the general population. However, a considerable amount of further information can be derived by inspecting the relative absolute mean positions of the experimental groups on the rating scale even though they may not differ significantly among themselves. In general, as opposed to the NCMP group, those in the C group appear to have had a considerably more loose-knit, free, and independent type of training. They appear to be decidedly more interested in scientific investigation than in a more socially oriented activity. Their relative non-concern with other people, authority, rules, regulations, restrictions, and the like indicate a decided degree of independence, unshaken by pressures from the external world. Their personal, social, and emotional adjustment is superior to that of their less eminent colleagues; but it is not, by any means (on an absolute scale), close to a perfect adjustment. They appear to be unusually self-oriented in most respects, paying little attention to such things as social and sexual relationships and public or professional criticism. At the same time, they appear to be able to accept without any overconcern, moral and social relationships and

activities such as religious affiliation, friendships, politics, and the like. There is however, in regard to these latter, a tendency to "go through the motions" without any great emotional involvement. This self-orientation and lack of concern with the social environment does not appear to be an attempt to escape, but merely the result of an evaluation of life that places such things toward the bottom of a hierarchy of importance. In general, this group appears to have been given early independence combined with responsibility - much more so than either the MCP or MCNP groups - and they received somewhat more family, rather than non-family, pressure for achievement, but always within a less emotive and frantic atmosphere than the other groups.

The MCP group differs from the C group to a lesser degree than does the MCNP group. It differs largely in its greater concern with people and social relationships and its lesser independence and responsibility; its greater competativeness and rebelliousness, and in regard to a smaller degree of family pressure for educational achievement. The MCNP group, on the other hand, appears to have had a much more stormy childhood and maintains a much more contemptuous, emotionally tinged, and rebellious attitude toward society in general and authority in particular. They have undergone a more rigid, well-outlined professional training than the C group and appear to have been more concerned with, and diverted by, interpersonal and social relationships. This group also shows more signs of neuroticism and feelings of insecurity and inferiority, both in early life and at present, than does the C group. The MCNP group also appears to be considerably more fearful, dependent, and concerned with both peer and public approval.

The implications of these findings must, because of the pilot nature of the study, be considered cautiously; but within that limitation, some interesting speculations may be made. The first is that early childhood training may be of somewhat less importance in the development of creativity than is

sometimes suggested. There is no indication for example, that sibling or Oedipal rivalry have much to do with differences in creativity. The most important factor in the early home environment appears to be the delegation of definite responsibility at an early age, and the valuation, within the family group, of education and/or knowledge for its own sake. This appears to be considerably more important than whether or not the family is of professional, middle-class origin, as Roe suggests.

In addition, it would appear that a non-directive, relatively unstructured, advanced training is of significant benefit. The most outstanding feature, educationally, is that the C group and to some extent the MCP group, as opposed to the MC'P group, received what might be described as a "laissez-faire" type of graduate training. They had few, if any, required courses, encouragement of research activity to the exclusion of formal courses, and significant freedom of choice as to both courses and research. The experiences of the members of the creative group might better be described in their own words, "We had tremendous freedom at _____ University. This period was a very interesting one. We were taught practically nothing. We developed a colloquium and generally taught ourselves. Now I think we tend to keep our students in class too much". Or, "I very often read a Ph.D. thesis done under me and I don't know what is in it until I open it. _____ made an appointment with me to discuss his thesis. I assumed it was about the plans for it. Well, he brought the completed thesis in; and you know, that's the way it ought to be". Or, "Frankly, I think things now are going to the dogs. I approve of the apprenticeship program of training. Here we have no required courses. Students do research. When I was a graduate student the same situation existed. Why, when it came time to get my Ph.D., I took my publications, bound them and retitled them, and it was accepted." This would seem to speak poorly for the increasingly structured, rigidly outlined educational programs now so prevalent. The American Psychological Association is an outstanding offender in this

respect with its multiplicity of evaluative and inspecting committees. It might behoove the American Psychological Association, as well as other educational and professional agencies, to place more faith in institutional faculties and less upon roving bands of "inspectors general". There can be little doubt that conformity, enforced to the point of producing emotional reaction, is detrimental to creativity.

Also of interest is the possibility, in view of the apparently greater feminine identification of the C as opposed to the HCP and HCHP groups, that such identification might not be as personally and professionally destructive as is suggested by some analytically oriented psychologists. The problem of feminine identification would appear to be more a problem of the individual's acceptance of it than its mere existence.

Still another factor that might well be considered in both child training and in educative procedures is the extent to which responsibility for behavior is placed upon the individual. The creative group appears to be a more responsible, self-accepting, and tolerant group than either of the control groups. It seems apparent that this is derived from a family and educational experience where responsibility and self-acceptance are coupled, and where dependency and its consequences, anxiety and rebelliousness, are diminished.

There were several other characteristics of the experimental groups, even though their statistical significance might be questionable, which were discernable from an examination of the interview protocals. In general, the creative group came from a background where the "right" sort of behavior was expected but where there was little overt coercion in regard to this behavior. The individual was given a good deal of freedom and personal responsibility at an early age with the largely unenforced expectation that he would behave in a creditable manner. There was also an apparent element of emotional coolness in the family relationships. It appeared that respect was a more important factor in these relationships than strong emotional attachments, and

although emotional attachments most certainly were not lacking, they appeared to be secondary. This is in marked contrast to the NCP group where emotional relationships were decidedly emphasized but where conflict - emotional and/or social - was outstanding, and to the NCIP group where partial rejection and/or suppression was added to the emotionality and conflict.

One might speculate at this point that the outstandingly creative individual is one who, at an early age, effectively intellectualizes his emotionality; whereas one who is decidedly productive and somewhat creative tends to displace his emotionality. Those who are creatively unproductive tend to suppress or repress their emotionality and consequently feel inhibited and bound.

There were several other factors which may be of interest, the first being the receptiveness of the subjects to the interviewing procedure. All but one of the creative group were most receptive and socially responsive; and their reaction to the interview situation would lead one to suspect that, for the most part, they were as cooperative and responsive as they were capable of being. One bit of evidence for this is found in the manner of expression and its change, which is apparent in most of the interviews. In the first ten to twenty minutes, the subject's language was polite, objective, and scientific to a large degree. After that period, more often than not, "father" had become "the old man" and "my sibling" had become "that stupid brother of mine".

Two other factors regarding the general characteristics of the experimental group might deserve some comment. Although at least half of the original list of prospective subjects were applied psychologists (those sanctioned by the ABEPP), only three applied psychologists were in the creative group; and those particular ones were equally noted for their contributions to other areas of psychology. This appears to be a rather sad commentary on the effectiveness and meaningfulness of the American Board Examinations. The other factor involves geographic location. If you draw a line from

Washington D.C. through the Menninger Clinic to Los Angeles you will have isolated, in the upper portion, the entire creative population. Five institutions - Stanford, California, Minnesota, Harvard, and Yale - contributed by far the majority of the creative subjects.

SUMMARY

A group of creative, non-creative productive, and non-creative non-productive psychologists were compared on ten motivational factors, sixteen personality factors, and eighty-nine etiological, developmental, and educational factors derived from an unstructured personal interview. In general, the C group appeared to be more self-accepting, independent, responsible, religiously oriented; and less neurotic, rebellious, or concerned with social and interpersonal relationships than the NCP group. In addition, their professional training was decidedly more laissez-faire, unstructured, and free from regulations than the NCNP group. The NCP group was, on the other hand, more competative and rebellious and more concerned with social relationships than the C group. The NCNP group appears to be a more contemptuous, rebellious group, decidedly concerned with social and emotional relationships. Their professional training was rigid and highly structured and their family relationships more emotionally tinged than the C group. There are also indications of neurotic symptoms and stronger feelings of insecurity and inferiority in the NCNP group . These appear to be less prevalent in the C and NCP groups.

The results suggest that some revision of current professional training procedures might be of benefit in the encouragement of creativity, and that the family and emotional and educational environment is of considerably greater importance in fostering creativity than the family socio-economic circumstances. Early family responsibility and an opportunity for independence of action are also of considerable value. In addition, it would appear that educational experiences are decidedly influential in fostering or suppressing creative potential.

Table I

Means and t ratios between the Creative (I) group and the Non-Creative, Non-Productive (II) group on 89 variables[a] rated on a 7 point scale with a 1 rating indicating disagreement and a 7 rating indicating agreement.

Item	M_I	M_{II}	t	Item	M_I	M_{II}	t
1.	5.33	2.74	3.92**	14.	5.53	5.20	0.46
2.	2.57	2.71	0.33	15.	2.76	3.26	1.09
3.	3.19	5.57	4.10**	16.	3.40	4.66	1.59
4.	2.27	5.37	3.60**	17.	4.36	4.71	0.42
5.	2.96	2.80	0.18	18.	3.24	3.97	0.96
6.	4.63	3.57	1.86	19.	2.61	2.42	0.42
7.	3.24	3.11	0.24	20.	2.46	5.08	3.01**
8.	3.97	4.37	0.48	21.	4.38	3.31	2.18*
9.	2.78	4.23	1.59	22.	6.00	3.45	2.87**
10.	2.40	3.91	1.68	23.	2.04	3.91	2.53*
11.	2.43	4.17	2.10*	24.	2.03	4.31	2.51*
12.	2.06	4.71	2.98**	25.	2.48	3.14	0.88
13.	5.38	3.60	2.22*	26.	2.50	2.37	0.23

* significant at or beyond the 5% level of confidence

** significant at or beyond the 1% level of confidence

[a] variables described in Appendix A

Table I continued

Item	M_I	M_{II}	t	
27.	2.02	5.54	4.96	**
28.	2.81	4.17	1.77	
29.	4.23	2.77	2.18	*
30.	4.20	3.42	1.15	
31.	4.41	2.51	3.33	**
32.	4.70	2.68	3.67	**
33.	4.82	2.77	3.36	**
34.	3.51	5.17	2.67	*
35.	3.48	4.97	0.30	
36.	4.77	4.46	0.38	
37.	3.14	3.91	0.22	
38.	3.86	3.54	0.48	
39.	4.50	3.60	1.28	
40.	4.07	3.91	0.25	
41.	3.28	3.34	0.10	
42.	3.10	3.43	0.45	
43.	4.39	2.85	2.75	*
44.	3.80	2.00	4.00	**
45.	4.27	2.86	2.27	*
46.	4.28	3.54	0.80	
47.	4.26	2.80	1.90	
48.	4.42	2.62	3.40	**
49.	3.76	4.11	0.48	
50.	3.73	3.11	0.86	
51.	3.22	3.80	0.91	
52.	3.69	5.54	3.25	**
53.	4.08	2.94	1.50	
54.	2.53	2.88	0.69	
55.	5.28	5.51	0.45	
56.	4.71	6.34	3.98	**
57.	2.44	2.60	0.44	
58.	5.08	5.94	2.61	*
59.	2.74	2.06	2.43	*
60.	4.68	4.83	0.27	
61.	3.01	4.60	2.52	*
62.	4.39	2.94	2.50	*
63.	3.68	4.00	0.48	
64.	5.07	3.91	1.63	
65.	3.81	4.08	1.00	
66.	3.21	2.91	0.45	

Table I continued

Item	M_I	M_{II}	t
67.	3.76	3.26	0.75
68.	4.97	4.48	0.58
69.	4.83	3.46	2.08*
70.	3.36	4.51	1.98
71.	4.37	3.94	0.52
72.	3.36	4.74	1.48
73.	4.50	4.26	0.28
74.	2.22	3.74	1.92
75.	3.09	2.48	0.88
76.	4.01	5.51	4.28**
77.	4.64	2.77	2.92**
78.	3.60	3.17	0.56
79.	3.86	4.51	0.98
80.	3.82	4.28	0.60
81.	3.47	5.06	2.65*
82.	4.02	4.57	1.25
83.	2.82	4.34	3.38**
84.	4.10	3.14	1.78
85.	4.29	3.63	0.86
86.	3.91	3.91	0.00
87.	2.76	3.69	1.13
88.	4.12	4.23	0.14
89.	3.53	4.49	1.13

Table II

Means and t ratios between the Creative (I) and the Non-Creative, Productive (III) group on 89 variables[a] rated on a 7 point scale with a 1 rating indicating disagreement and a 7 rating indicating agreement.

Item	M_I	M_{III}	t	Item	M_I	M_{III}	t
1.	5.33	4.76	1.19	14.	5.53	5.8	0.75
2.	2.57	3.52	2.57*	15.	2.76	2.72	0.11
3.	3.19	3.52	1.18	16.	3.40	4.32	1.19
4.	2.27	2.48	0.43	17.	4.36	3.76	1.02
5.	2.96	~~2.72~~ 3.56	0.86	18.	3.24	3.4	0.30
6.	4.63	5.0	0.66	19.	2.61	2.56	0.12
7.	3.24	2.36	1.87	20.	2.46	2.84	0.52
8.	3.97	5.52	2.72*	21.	4.38	4.32	0.13
9.	2.78	3.24	0.27	22.	6.00	5.36	1.45
10.	2.40	2.40	0.00	23.	2.04	3.64	2.27*
11.	2.43	2.32	0.28	24.	2.03	2.76	2.08*
12.	2.06	2.88	1.02	25.	2.48	2.28	0.56
13.	5.38	3.80	2.32*	26.	2.50	3.24	1.90

* significant at or beyond the 5% level of confidence

** significant at or beyond the 1% level of confidence

[a] variables described in Appendix A

Table II continued

Item	M_I	M_{III}	t	Item	M_I	M_{III}	t
27.	2.02	2.72	1.49	47.	4.26	4.12	0.17
28.	2.81	2.92	0.23	48.	4.42	4.72	0.45
29.	4.23	3.32	1.65	49.	3.76	4.24	0.56
30.	4.20	3.88	0.42	50.	3.73	3.48	0.38
31.	4.41	4.08	0.42	51.	3.22	3.68	1.18
32.	4.70	5.08	0.66	52.	3.69	3.44	0.38
33.	4.82	3.96	1.79	53.	4.08	3.40	1.33
34.	3.51	4.20	1.97	54.	2.53	3.32	1.08
35.	3.48	3.24	0.45	55.	5.28	5.72	1.10
36.	4.77	4.64	0.43	56.	4.71	5.96	2.72 *
37.	3.14	3.48	0.72	57.	2.44	3.12	1.24
38.	3.86	3.64	0.34	58.	5.08	4.64	1.51
39.	4.50	3.96	1.35	59.	2.74	2.68	0.19
40.	4.07	4.32	0.49	60.	4.68	5.40	1.08
41.	3.28	3.88	1.54	61.	3.01	3.80	1.10
42.	3.10	4.08	3.06 **	62.	4.39	3.76	1.80
43.	4.39	3.68	1.09	63.	3.68	4.08	1.69
44.	3.80	3.68	0.12	64.	5.07	4.72	1.09
45.	4.27	3.92	1.35	65.	3.81	3.44	0.53
46.	4.28	4.12	0.21	66.	3.21	2.80	0.57

Table II continued

Item	M_I	M_{III}	t	Item	M_I	M_{III}	t
67.	3.76	3.76	0.00	87.	2.76	3.32	1.36
68.	4.97	5.56	1.31	88.	4.12	4.56	1.07
69.	4.13	4.44	0.59	89.	3.53	3.48	0.83
70.	3.36	3.64	0.62				
71.	4.37	3.76	0.95				
72.	3.3.	4.80	2.18*				
73.	4.10	4.84	0.52				
74.	2.12	2.04	0.69				
75.	309	2.28	2.31*				
76.	401	4.44	1.19				
77.	4.64	3.64	1.96				
78.	3.60	2.00	4.32**				
7.	3.86.	3.60	0.54				
0.	3.82	3.52	0.45				
81.	3.47	3.44	0.06				
82.	4.02	3.76	0.62				
83.	2.82	3.12	0.81				
84.	4.10	3.76	0.60				
85.	4.29	3.76	0.84				
86.	3.91	2.16	1.77				

Table III

Means and t ratios between the Creative (I) group and the Non-Creative, All combined (IV) groups on 89 variables[a] rated on a 7 point scale with a 1 rating indicating disagreement and a 7 rating indicating agreement.

Item	M_I	M_{IV}	t	Item	M_I	M_{IV}	t
1.	5.33	3.58	3.36**	14.	5.53	5.45	0.17
2.	2.57	3.05	1.45	15.	2.76	3.03	0.82
3.	3.19	4.75	3.32**	16.	3.40	4.53	2.35*
4.	2.27	4.17	3.02**	17.	4.36	4.32	0.07
5.	2.96	2.78	0.33	18.	3.24	3.73	1.00
6.	4.63	4.17	0.98	19.	2.61	2.48	0.39
7.	3.24	2.88	0.92	20.	2.46	4.15	2.41*
8.	3.97	4.85	1.60	21.	4.38	3.73	1.22
9.	2.78	3.82	1.70	22.	6.00	4.25	2.82**
10.	2.40	3.45	1.78	23.	2.04	3.55	3.08**
11.	2.43	3.40	1.70	24.	2.03	3.67	2.83**
12.	2.06	4.45	3.62**	25.	2.48	2.78	0.62
13.	5.38	3.86	3.04**	26.	2.50	2.73	0.58

* significant at or beyond the 5% level of confidence

** significant at or beyond the 1% level of confidence

[a] variables described in Appendix A

Table III continued

Item	M_I	M_{IV}	t
27.	2.02	4.37	3.62**
28.	2.81	3.35	0.92
29.	4.23	3.00	2.46*
30.	4.20	3.62	1.09
31.	4.41	3.17	2.25*
32.	4.70	3.10	2.96**
33.	4.82	3.25	3.41**
34.	3.51	4.77	3.00**
35.	3.48	4.25	1.51
36.	4.77	4.53	0.49
37.	3.14	3.73	1.31
38.	3.86	3.58	0.57
39.	4.50	3.75	1.63
40.	4.07	4.08	0.02
41.	3.28	3.57	0.72
42.	3.10	3.37	0.53
43.	4.39	3.20	2.59*
44.	3.80	2.70	1.93
45.	4.27	3.30	2.42*
46.	4.26	3.77	0.81
47.	4.26	3.35	1.47
48.	4.42	3.33	1.88
49.	3.76	4.17	0.89
50.	3.73	3.27	0.96
51.	3.22	3.75	1.43
52.	3.69	4.67	1.78
53.	4.08	3.13	1.90
54.	2.53	3.07	1.29
55.	5.28	5.60	0.89
56.	4.71	6.18	3.74**
57.	2.44	2.82	1.06
58.	5.08	5.40	0.97
59.	2.24	2.15	1.97
60.	4.68	5.07	1.05
61.	3.01	4.27	2.74*
62.	4.39	3.05	2.97**
63.	3.68	4.03	0.76
64.	5.07	4.25	1.64
65.	3.81	3.82	0.02
66.	3.21	2.87	0.67

Table III continued

Item	M_I	M_{IV}	t
67.	3.76	3.47	0.47
68.	4.97	4.93	0.07
69.	4.83	3.78	2.23*
70.	3.36	4.12	1.90
71.	4.37	3.70	1.14
72.	3.36	4.77	2.31*
73.	4.50	4.50	0.00
74.	2.22	3.03	2.02
75.	3.09	2.33	1.65
76.	4.01	5.07	3.38**
77.	4.64	3.13	3.21**
78.	3.60	2.68	1.74
79.	3.86	4.12	0.56
80.	3.82	3.98	0.26
81.	3.47	4.38	1.90
82.	4.02	5.32	3.61**
83.	2.82	3.83	2.80**
84.	4.10	3.40	1.67
85.	4.29	3.68	1.15
86.	3.91	3.60	0.57
87.	2.76	3.53	1.57
88.	4.12	4.37	0.51
89.	3.53	4.07	0.95

TABLE IV

Means and t's Between the Creative (I) and the Non-Creative, Non-Productive (II) Groups on the 16 P.F. Factors.

FACTORS		M (I)	M(II)	t
A	Cyclothymia-schizothymia	6.87	8.33	NS
B	Intelligence	10.31	10.66	NS
C	Ego strength	15.75	12.83	NS
E	Dominance	15.93	15.33	NS
F	Surgency	10.25	11.33	NS
G	Super-ego	9.43	8.00	NS
H	Adventurous cyclothymia	13.00	8.33	.01
I	Sensitive emotionality	10.00	12.16	NS
L	Paranoia	7.62	8.33	NS
M	Bohemian unconcern	12.62	15.66	.05
N	Sophistication vs rough simplicity	10.31	11.83	NS
O	Free anxiety	8.87	12.50	.05
Q1	Radicalism	14.31	15.00	NS
Q2	Self-sufficiency	13.56	13.00	NS
Q3	Super-ego, will control	11.87	11.83	NS
Q4	Psychosomatic anxiety	9.62	16.66	.01

TABLE V

Means and t's Between the Creative (I) and the Non-Creative, Productive (III) Groups on the 16 P.F. Factors

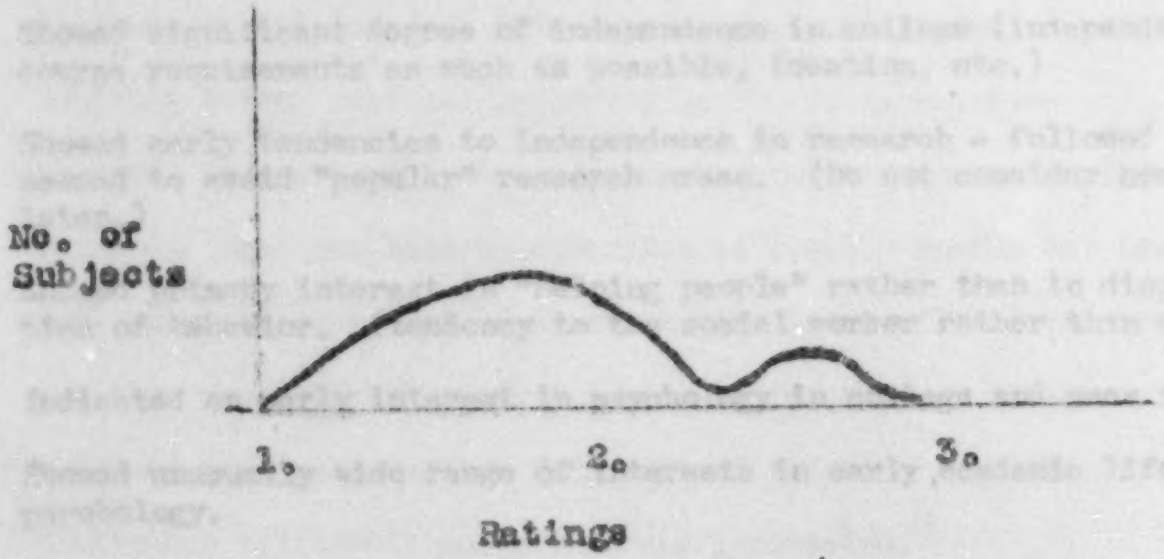
FACTORS		M (I)	M(III)	t
A	Cyclothymia-schizothymia	6.87	8.75	NS
B	Intelligence	10.31	10.00	NS
C	Ego strength	15.75	14.25	NS
E	Dominance	15.93	18.75	.05
F	Surgency	10.25	14.00	.01
G	Super-ego	9.43	6.50	.01
H	Adventurous cyclothymia	13.00	18.00	.05
I	Sensitive emotionality	10.00	12.75	NS
L	Paranoia	7.62	8.25	NS
M	Bohemian unconcern	12.62	11.75	NS
N	Sophistication vs rough simplicity	10.31	8.00	.05
O	Free anxiety	8.87	8.50	NS
Q1	Radicalism	14.31	13.00	NS
Q2	Self-sufficiency	13.56	12.00	NS
Q3	Super-ego, will control	11.87	9.75	NS
Q4	Psychosomatic anxiety	9.62	8.50	NS

TABLE VI

Means and t's Between the Creative (I) and the Non-Creative Combined (IV) Groups on the 16 P.F. Factors.

FACTORS		M (I)	M(IV)	t
A	Cyclothymia-schizothymia	6.87	8.50	NS
B	Intelligence	10.31	10.40	NS
C	Ego Strength	15.75	13.40	NS
E	Dominance	15.93	16.70	NS
F	Surgency	10.25	13.40	.05
G	Super-ego	9.43	7.40	.05
H	Adventurous cyclothymia	13.00	12.20	NS
I	Sensitive emotionality	10.00	12.40	NS
L	Paranoia	7.62	9.20	NS
M	Bohemian unconcern	12.62	14.10	NS
N	Sophistication vs rough simplicity	10.31	10.30	NS
O	Free anxiety	8.87	10.90	NS
Q1	Radicalism	14.31	14.20	NS
Q2	Self-sufficiency	13.56	12.60	NS
Q3	Super-ego, will control	11.87	11.00	NS
Q4	Psychosomatic anxiety	9.62	13.40	NS

Figure 1



APPENDIX A

Description of the 89 variables used for interview analysis:

1. Relationships with graduate instructors were in the nature of a "superior-inferior" or "employer-employee" nature.

2. Relationships with other graduate students were cooperative rather than competative.

3. In graduate training, skepticism, inquisitiveness and rebelliousness were encouraged.

4. Graduate training was largely unstructured.

5. The financial responsibility of college and graduate training was assumed by the subject.

6. Major academic stimulation was provided by peers rather than parental or educational figures.

7. Major academic stimulation was provided by educators rather than parents or parental figures.

8. Major academic stimulation was provided by parents or parental figures other than educators.

9. Showed significant degree of academic success prior to college training.

10. Showed significant degree of academic success prior to graduate training.

11. Showed significant degree of independence in college (independence of instructors, course requirements as much as possible, ideation, etc.)

12. Showed early tendencies to independence in research - followed own interests and seemed to avoid "popular" research areas. (Do not consider how popular they became later.)

13. Showed primary interest in "helping people" rather than in dispassionate investigation of behavior. (tendency to the social worker rather than scientific orientation)

14. Indicated an early interest in psychology in college and sees it as a "first love".

15. Showed unusually wide range of interests in early academic life - not principally psychology.

16. Was decidedly influenced by senior professors, but <u>not in direction or type</u> of work undertaken.

17. Was decidedly influenced by senior professors <u>in the direction or type</u> of work undertaken.

18. Showed an interest in senior psychologists as persons, rather than as "professionals, father-figures, glory figures", etc.

19. Entrance into field of psychology was fortuitous and not the result of long term planning.

20. Was publishing <u>independent work</u> in college or graduate school.

21. Pressure of professional and administrative committments has interfered with current research efforts.

22. Graduate work was thoroughly outlined and closely supervised.

23. attitude toward own graduate training positive.

24. Was given freedom of choice of courses and research as a graduate student.

25. Developed warm, personal relationship with graduate instructor or instructors as well as a professional relationship.

26. Relationships to fellow graduate students were enjoyable and stimulating.

27. Was decidedly more industrious and scientifically active than average.

28. Was decidedly more interested in educational activities than average as a child and adolescent.

29. Showed signs of neuroticism in early life.

30. Engaged in few if any of the usual childhood and adolescent social activities.

31. In early life, felt inferior to others, socially.

32. Shows indications of marked generalized feelings of inferiority.

33. Attitude toward external authority is one of contempt.

34. Attitude toward external authority is one of non-concern.

35. Attitude toward social controls on own behavior is one of disregard.

36. Self sentiment can best be described as overtly humble but covertly grandiose.

37. Self sentiment can best be described as matter of fact and realistic.

38. Creative productivity ameliorates basic feelings of insecurity or inferiority.

39. Received more satisfaction from recognition than from the actual work done.

40. Family was relatively loose knit and permissive.

41. Sexual interests developed late and were not especially important to subject.

42. Was given definite responsibilities in the house at an early age.

43. Shows evidence of emototicism presently.

44. Felt more comfortable with and confided in the mother rather than the father in early life.

45. Punishment was used more frequently than reward in the subjects family as a training device.

46. Was socially withdrawn or timid as a child.

47. Family was mobile (moved one or more times during subjects early life.)

48. Tends to avoid criticism as much as possible.

49. Is accepting of criticism.

50. Amusement facilities were limited in subjects early life (eg: subject had to provide own amusement to a large extent)

51. In early life, peer group relationships were largely ignored or accepted in a matter of fact fashion.

52. Showed some evidence of creativity in early life (pre-college).

53. Interpersonal relationships among parents and siblings were anxiety producing.

54. Family had orthodox religious affiliations.

55. Shows indications of guilt feelings regarding religious "backsliding".

56. Presently adhers to the tenets of some orthodox religious group.

57. Had some orthodox religious upbringing.

58. Has little or no need for expressions of external approval.

59. Finds his needs for approval satisfied primarily by "in-group" or "professional group" approval.

60. Finds his needs for approval satisfied primarily by "general public" approval.

61. Sexual life and concern over relationships with the opposite sex are given little concern or emphasis.

62. Early social adjustment was of decided importance and was given much emphasis.

63. Familial emotional relationships were largely intellectualized - existing, but not as expressive as average.

64. Recognition for professional and administrative activities has tended to replace recognition for scientific activities in the subjects own need system.

65. Shows evidence of Narcissism.

66. There is indication of geographic, emotional, or social isolation as a child.

67. Shows strong need for approval and encouragement.

68. Is concerned about moral issues (moral in the strict sense).

69. Shows evidence of fear of authority.

70. Independence of action was encouraged in childhood and adolescence.

71. Family pressure for educational achievement was mild and matter of fact.

72. There are indications of strong family pressure for educational achievement.

73. Shows indications of sibling rivalry.

74. Takes considerable pride in academic and educational achievements.

75. Has liberal social and/or political views.

76. Authority is ignored rather than fought or submitted to.

77. Shows indications of current or recent rebellion against authority.

78. Shows indications or early rebellion against authority.

79. Ideas (scientific, professional, personal, political, etc) more radical in previous times than at present.

80. Engaged in unusual, out of the ordinary activities as a child.

81. Times of greatest creativity and/or productivity were in subjects early career.

82. Periods of greatest creativity were also periods of greatest freedom of time and availability of funds and equipment.

83. Creative efforts seem to result from intrinsic motives.

84. Creative efforts seem to result from extrinsic motives.

85. Displays a need to show the world that he is not only as good as anyone else, but better than most, particularly in regard to his chosen areas of interest.

86. Shows evidence of a hostile skepticism, both in psychology and in regard to life in general.

87. Has the feeling that, "If you want to know something, you have to find it out for yourself".

88. Is primarily an organizer and categorizer in field of major interest.

89. Subject is more concerned with hypothesis-producing rather than hypothesis-testing research.